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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/966,410	09/28/2001	Miroslav Trajkovic	US010476 (702498)	4349

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EXAMINER

BHATNAGAR, ANAND P

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/966,410

Applicant(s)

TRAJKOVIC ET AL.

Examiner

Anand Bhatnagar

Art Unit

2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4-16 and 20-25 is/are allowed.
- 6) ☒ Claim(s) 1-3 and 17-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Arguments

1. Applicant's amendment filed on 12/23/04 has been entered and made of record.
2. Applicant has amended claims 1, 2, 4, 17, and 20. Applicant has added 5 new claims (#21-25). Currently claims 1-25 are pending.
3. Regarding claims 4 and 20, applicant has amended these claims to make them allowable by taking examiner's objection to these claims and making them independent by incorporating all the limitations of all the claims that they were dependent from, respectively, either directly and indirectly. Further, new claims 21-25 are either directly or indirectly dependent from newly independent claim 20 and are enabled by the specifications, therefore these new claims are allowed.
4. Applicant's arguments filed on 12/23/04 have been fully considered but they are not persuasive. Applicant's representative in essence that argues that the newly amended claims 1 and 17 now recite a feature of "detecting not more than four points" and this is nowhere taught by the prior art of Liu ("Robust Head Motion Computation by Taking Advantage of Physical Properties," Proc. Workshop On Human Motion, December 2000, pages 73-77) and/or Chen ("Head pose estimation using both color and feature information," Pattern Recognition, 2000. Proceedings. 15th International conference On September 3-7, 2000, Los Alamitos, CA, USA, IEEE Comput. SOC. US, September 3, 2000, pages 842-845). Further, applicant's representative argues that applicant's instant invention is a linear method and is claimed in claim 1 to be a linear

system, wherein the prior art Liu and/or Chen do not teach this feature and are nonlinear methods. Examiner disagrees. For the first argument of "no more than four points" is a newly added feature. This feature is also new subject matter since nowhere in the specifications does it show "no more than four points". As this feature implies it can be anywhere from 1 to 4 points but the specifications only give one embodiment where there are four points used and no embodiments showing anything less than four points, therefore, this is considered to be new subject matter by the examiner and these claims will be addressed as originally filed. As for the second argument applicant's representative argues that applicant's instant invention is a linear system while the prior art discloses/teaches a nonlinear system is a correct statement by applicant's representative but this linear method is only claimed in the preamble and is nowhere in the main body of either of claim 1 nor claim 17. Therefore, examiner does not give any weight to the system be a linear system. Examiner refers to the rejection below.

DETAILED ACTION

Claim Rejections - 35 USC § 112

5. A.) The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1 and 17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicant has amended these claims with the feature of "no more than four points" which is new subject matter since it previously not in applicant's instant invention as originally filed.

B.) The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2 and 18 recite the limitation "said four points." There is insufficient antecedent basis for this limitation in the claim. The claims from which they depended from recite "no more than four points" creating an antecedent problem since it can be 1 to 4 points and not just four points.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 17, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Liu et al. ("Robust Head Motion Computation by Taking Advantage of Physical Properties," Proc. Workshop On Human Motion, December 2000, pages 73-77).

Regarding claims 1 and 17: A linear method for performing head motion from facial feature data (Liu et al.; abstract), the method comprising estimation the steps of:

obtaining first facial image and detecting a head in said first image (Liu et al.; section 2 on page 73, wherein the points on a head in an image are determined);

detecting position of four points P of said first facial image where $P = \{p_{\text{sub } 1}, p_{\text{sub } 2}, p_{\text{sub } 3}, p_{\text{sub } 4}\}$, and $p_{\text{sub } k} = (x_{\text{sub } k}, y_{\text{sub } k})$ (Liu et al.; section 2 on page 73 and section 2 continued on page 74, wherein five points (E1, E2, M1, M2, and N) on the face are determined and used. These points are equivalent to applicant's points of p_1 - p_4 because they are the corners of the eyes and the corners of the mouth. The coordinates of each of these points are determined, second full paragraph of left column on page 74 of Liu et al., which are read as applicant's coordinates of $p_{\text{sub } k}$);

obtaining a second facial image and detecting a head in said second image (Liu et al.; section 2 page 74 third full paragraph, wherein two images are used);

detecting position of four points P' of said second facial image where $P' = \{p'_{\text{sub } 1}, p'_{\text{sub } 2}, p'_{\text{sub } 3}, p'_{\text{sub } 4}\}$; and $p'_{\text{sub } k} = (x'_{\text{sub } k}, y'_{\text{sub } k})$ (Liu et al.; section 2 page 74 third and fourth full paragraphs and equations 1 and 2, wherein two images are used and the corresponding points are determined in each image);

determining the motion of the head represented by matrix R and translation vector T using said points P and P' (Liu et al.; section 2 page 74 third and fourth full paragraphs and equations 1 and 2, wherein two images are used and the corresponding points are determined in each image. The $m_{\text{sub } l}$ in equation 1 is equivalent to P and $m'_{\text{sub } l}$ is read as P' . The R is the rotation and t is the translation in the equations).

Regarding claims 2 and 18: The linear method wherein said four points P of said first facial image and four points P' of said second facial image include locations of outer corners of each eye and mouth of each respective first and second facial image (Liu et al.; page 73 section two bottom paragraph).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. ("Robust Head Motion Computation by Taking Advantage of Physical Properties," Proc. Workshop On Human Motion, December 2000, pages 73-77) and Chen et al. ("Head pose estimation using both color and feature information," Pattern Recognition, 2000. Proceedings. 15th International conference On September 3-7, 2000, Los Alamitos, CA, USA, IEEE Comput. SOC. US, September 3, 2000, pages 842-845).

Regarding claims 3 and 19: The linear method wherein said head motion estimation is governed according to:

$$P' = R (P \text{ sub } i) + T$$

where $R =$ and $T = [T \text{ sub } 1 \quad T \text{ sub } 2 \quad T \text{ sub } 3]$

represent camera rotation and translation respectively, said head pose estimation being a specific instance of head motion estimation.

Liu et al. discloses to perform the estimation of motion of a head/face between two images by incorporating the rotation and translational parameters. Liu et al. does not teach to incorporate the rotational and translational parameters as defined above in claim 3. Chen et al. discloses to use the rotation and translational parameters as defined above in claim 3 (Chen et al.; all of section 4 pages 843-844, especially equations 5-7. The $F \text{ sub } i$ and $F' \text{ sub } i$ are read as applicants $P \text{ sub } i$ and $P' \text{ sub } i$). It would have been obvious to one skilled in the

art to combine the teaching of Chen et al. to that of Liu et al. because they are analogous in determining head motion between two images. One in the rat would have been motivated to incorporate the teaching of Chen et al. into the system of Liu et al. in order to have a system that gives much more reliable recognition results (Chen et al.; first paragraph right column on page 842).

Allowable Subject Matter

8. Claims 4-16 and 20-25 are allowed.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will

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the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anand Bhatnagar whose telephone number is (571) 272-7416, whose acting supervisor is Jingge Wu whose number is (571) 272-7429, Central fax is 571-273-8300, and Tech center 2600 customer service office number is 703-306-0377.



**SAMIR AHMED
PRIMARY EXAMINER**

AB

Anand Bhatnagar

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August 7, 2005